



# Development, Demonstration, and Field Testing of Enterprise-Wide Distributed Generation Energy Management System – Option Year

**Principle Investigator:** Steven Greenberg, RealEnergy, Inc.

**Subcontract Manager:** Holly Thomas, NREL 

**Purpose of Overall Research:** Conduct field-testing to establish the operational experience of RealEnergy’s energy management system across its network of DG resources and any improvements or upgrades.

**Accomplishment:** RealEnergy successfully modeled the inputs and supporting communication requirements necessary to install a command-and-control module on each of its DG systems that laid the foundation for optimized enterprise-wide dispatch

**Significance:** Using only off-the-shelf hardware, RealEnergy and its preferred vendor at the time, PML:

- Developed and integrated the necessary software to complement the metering hardware
- Enabled RealEnergy to meter, monitor, operate, and dispatch its fleet of DG systems simply, safely, cost-effectively, and within the parameters of Rule 21

**Accomplishment:** RealEnergy isolated system metrics that influence optimal dispatch and management of a DG network

- Codes were installed, field-tested, and continually improved in real-time operations
- Feedback data allowed RealEnergy to significantly improve the algorithms over time to make them more useful to operations, compliance, and billing departments

**Significance:** The dispatch of RealEnergy’s fleet of systems can now:

- Account for site demand *and* economic operating parameters and regulatory compliance issues
- Help individual systems independently avoid or minimize non-optimal dispatch scenarios
- Algorithms allow for the automated choice of dispatch options at potential hybrid projects

**Accomplishment:** Over the course of 2002, RealEnergy became the first DG company to successfully interconnect with every major utility in California

**Significance:** RealEnergy became a working laboratory influencing the DG-friendly development of California’s Rule 21. Later improvements to RealEnergy’s internal processes helped:

- Streamline interconnections
- Positively influence the utilities’ expectations and handling of interconnection applications for the entire DG community

**Accomplishment:** Launch of RealEnergy’s Enterprise-Wide Network & Management System website component

**Significance:** First DG website of its kind:

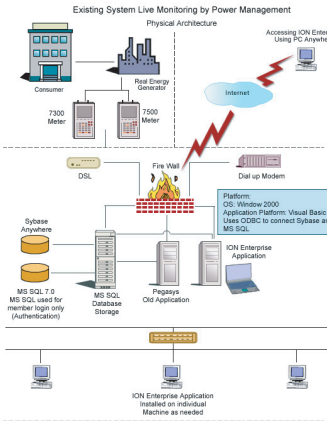
- Dynamically details onsite operational information for public consumption
- Serves as a public clearinghouse for information regarding interconnection, incentives, and RealEnergy’s interconnection experience in California

**Accomplishment:** RealEnergy is the only DG operator to upgrade from simple phone lines to a DSL subnet at each of its sites

**Significance:** Every major piece of equipment is now assigned an IP address. RealEnergy and can receive and share operational data in real time rather than in 15-minute intervals a day later

**Summary of Future Accomplishments:**

- Document improvements and upgrades to the system from the subcontract’s base year and why they were necessary
- Determine interconnection requirements
- Provide hardware and software evaluation once deployed in the field
- Continue maintaining the website



**DG Database Architecture**

**Primary Data Capture:**

- From Power Meter

**Primary Storage:**

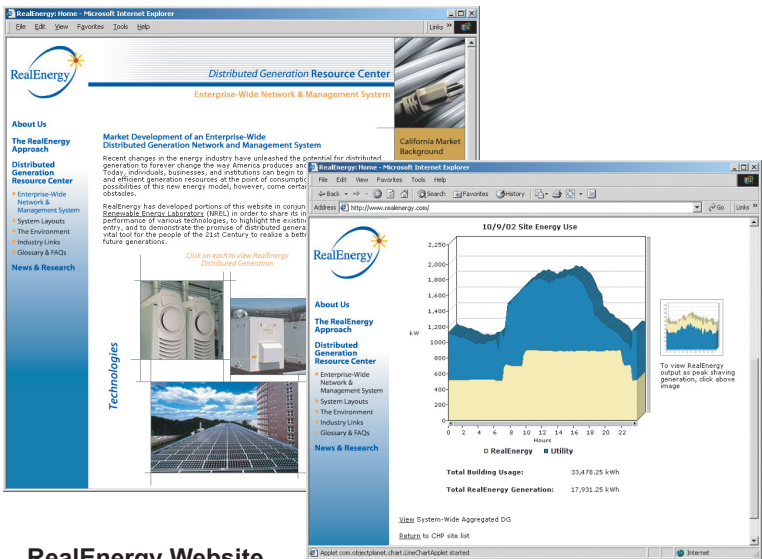
- Sybase Database

**Primary Application:**

- ION Enterprise (7500 Meter Series)

**Primary Purpose/Scope:**

- Analysis from work station on the power generation
- Publishing day-old information graphs on website and consumption reports



**RealEnergy Website**

This section was designed to show actual DG results across a portfolio of systems and technologies as well as provide information on interconnection, incentives, and RealEnergy’s interconnection experience